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A New Species in the Genus Amerocnemis (Hymenoptera: Psammocharidae) from North America with a Key to the Males of the Americas and Photomicrographs of the Genitalia of the N.Sp.

By R. R. DREISBACH, Midland, Michigan

Banks erected the genus *Amerocnemis* for four South American species.

This genus is closely allied to Priocnessus and like that genus has a very large broad clypeus, but unlike that genus has the front margin of the clypeus only very slightly raised above the labrum, while Priconessus has it raised very much above the labrum and the mouth parts. It is distinct from all the other genera of the Cryptocheilinae by reason of the elongate, narrow body, and superficially looks like the genus Auplopus (Auplopodinae) in the shape of the body but the species are much larger in size and the first abdominal segment has the sides straight and not hour-glass shaped. It also resembles Poecilopompilus (Batazonus) of the Psammocharinae by reason of the broad clypeus and by the light colored areas of the thorax of most of the species.

The species are long and narrow-bodied; claws toothed; no spines under last joint of posterior tarsi neither on ventral surface nor on the sides; spines at tip of front tibiae all of one size; clypeus very large, truncate in front and lying very close to the labrum; ocelli very large; labial and maxillary palpi slender; ocellar triangle is completely raised above the vertex; propodeum with the apex almost on a plane with the base and very hairy;

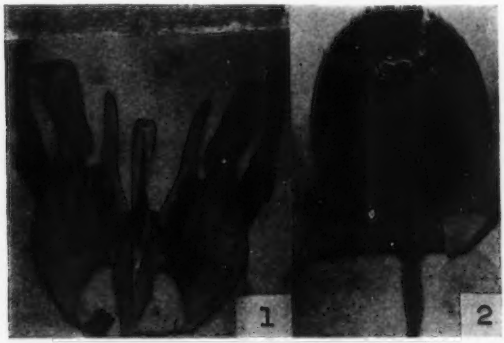
very few spines on the legs; wings very long and reach the tip of abdomen or are just short of the tip; basal vein basad of the transverse in the fore wings and like the genus Priocnessus the cubitus in rear wings meets the median vein before subdiscoidal; marginal cell very large and very long, its distance from wing tip is only about two-thirds of its length; the three cubital cells are very long, the third is shorter and broader than the others; the first recurrent vein meets the second cubital cell almost at the tip, and the second recurrent meets the third cubital cell before the middle. The first pair of claws are split in this genus.

All the previously described species have been from South America but in the Harvard collection there is a new species from Barro Colorado Island in the Canal Zone. The description of this species follows.

Amerocnemis nigricans n. sp. Figs. 1, 2

Holotype male: Black, clypeus, face, inner orbits to above the antennae, front of first antennal joint, posterior edge and sides of pronotum, and tegula yellowish white, with the legs shading from black on femora to reddish on the tibiae and tarsi; head, thorax, and fore part of first two pair of coxae covered with long, loose, white hair, longest on the fore coxae, fore edge of pronotum and on the propodeum; a few long whitish hairs on first tergite, and a few scattered ones on the first four ventrites, with two heavy patches on the fifth and sixth ventrals, reminiscent of the genus Anoplius; under the long hairs of head and thorax are rather long closely appressed white hairs; clypeus is rather long, truncate in front and with a black spot in center; when seen from the side, the clypeus has a large bulge at base and slopes to front, the whole ocellar triangle is completely visible above the eyes, as well as the antennal fossae, eyes very wide, four to five times as wide as the posterior orbits; when seen from in front, the inner orbits are parallel, the antennae are located above clypeus by about two-thirds the length of first antennal joint, vertex level with the eyes, ocellar triangle entirely above the vertex; anterior ocellus less than one-half its diameter from the laterals and these slightly farther apart than

their distance to eye margin; a depression between each lateral ocellus and the eyes, and a sulcus in front of anterior ocellus which becomes a line as it approaches the antennal fossae; antennae reddish but slightly darker on dorsal, basal joints, with the second joint black; the first joint is yellow in front and black on the basal dorsal half, the front with a large bump; the first four and last two antennal joints have their respective lengths as 10:2:12:14:10:12; pronotum very short, transverse and about one-third of dorsal surface yellowish white; mesonotum with the side edges turned up as a ridge their whole length and



FIGS. 1, 2. *Amerocnemis nigricans* n. sp.

with a raised line each side inside this turned-up edge which fades out just before the posterior edge; propodeum very long and sloping very slightly with the apex on almost the same plane as the base; wings yellowish all over, veins and stigma honey-yellow; marginal cell exceedingly long as are the three cubital cells; marginal cell three times as long as its distance to wing tip; second and third cubital cells very long, of about the same length but the third much broader at base than at apex, second cell long and narrow; the comparative lengths of the three cubital cells on the cubitus are 40:35:35; the third intercubital vein is parallel to the second intercubital for its basal half and then bends forward toward the marginal vein; the second re-

current vein meets the third cubital cell at apical sixth, and the first recurrent meets the second cubital cell about basal third; basal vein is much basad of the transverse vein in fore wings and is bowed outward as in the genus Halictus in the bees, while the cubitus in rear wings meets the median before the subdiscoidal; abdomen long and black, slightly shining; fore coxae long and rather slender, second pair the shortest and thickest, while the third pair has a rather deep linear pit on the posterior surface; fore femora and tibiae very slender, the other two, pair much thicker and the tibiae much longer; fore tibiae with a few spines on sides and ventral surface, the last two pair with shorter but more numerous spines; tarsi with numerous fine spines the last joints of one and two with a few on ventral surface but the last pair with none; the claws of first pair are split, those of the last two pair with a large sharp tooth; the comparative lengths of the three tibiae are as 30:60:80; the ratio of the lengths of the joints of the last legs are as 70:80:60:30:20:10:20; longer spur of posterior tibiae is one-half as long as its metatarsal joint.

Length: head and thorax 7.30 mm., abdomen 9.9 mm., fore wing 14.5 mm., rear wing 11.25 mm., genitalia length 1.59 mm., width 1.19 mm., subgenital plate length 1.62 mm., width 1.00 mm.

Holotype male: Barro Colorado Is., CANAL ZONE, Nov. 7, M. Bates (MCZ).

The following key adopted from Banks' paper will separate the American forms in the males:

1. Pale reddish brown spot above antennae to ocelli; antennae with groups of three joints black and three yellowish; mesonotum with median pale stripe; abdomen not plainly banded. *longulus* Banks
1. Black mark above antennae and over ocelli; antennae largely black above if abdomen banded, antennae reddish above if abdomen not banded. 2
2. Whole vertex and front dark colored; abdomen entirely black pronotum with posterior border yellowish-white as well as the tips of the side of pronotum. *nigricans,* n. sp.
2. Abdomen banded, antennae dark above. 3

3. Abdomen with segments dark at base, pale across tip; mesonotum with large pale spot in middle, propodeum with large pale spot each side; hind femora dark above. *brasiliensis* Banks

3. First and second abdominal segments not plainly banded; mesonotum with two pale lines, united behind; propodeum with an interrupted dark line each side; hind femora not dark above. *argentinica* Banks

The type of the genus *A. bequaerti* Banks is the only female known and its male is unknown.

LITERATURE REFERENCE

BANKS, N. 1946. Bull. Mus. Comp. Zool. 96, No. 4, pp. 464, 499–503.

The Occurrence of Mass Flight Movements in Hexagenia Occulta (Ephermeroptera)

By HERMAN G. COOKE, Department of Biology, Hampton Institute, Hampton, Virginia

For more than ten years, the writer has been deeply interested in the behavior pattern manifested in the order of mayflies. During this time several flight movements have been observed and the period of their greatest emergence recorded. In a previous investigation [1] a detailed description was presented on the mating flights of *Stenonema vicarium,* with particular reference to the life history of the nymph. In a later study,[2] involving the habits of *Isonychia christina,* it was revealed that a similar tendency toward shyness displayed in the performance of the adults found noteworthy expression in the behavior of the nymphs. Comments were also made with regards to the lofty height to which they frequently ascended which made observation possible only with the greatest degree of difficulty.

[1] COOKE, HERMAN G. 1940. Observation on the mating flight of mayflies, *Stenonema vicarium.* Ent. News 51: 12.

[2] COOKE, HERMAN G. 1942. Mating flights of Isonychia mayflies (Ephermeroptera). Ent. News 53: 249.

In a more recent study,[3] involving the influence of weather conditions on the activities of *Hexagenia atrocaudata,* it was found that low temperature served as a limiting factor in both the flight movements of the adults and the emergence of the nymphs. As a result of these findings a desire to seek a further understanding of the behavior of the species and of the underlying phylogenetic relationships prompted the presentation of this paper.

Methods

The methods used in the study were somewhat similar to those employed in the investigation of members of the other genera, the chief difference being occasioned by the environmental habits of the nymph. The most distinguishing characteristics of the immature stage of the genus Hexagenia is its tendency to lead an independent aquatic life, confined to a sand or mud-bottom burrow. Species adjustmented to situations of this nature afford great difficulty in collecting and can be encountered only by means of dredging. In some locations the method is often time consuming and has other definite limitations.

Subimagoes were occasionally seen emerging directly from the surface of the water without ascending on to rocks, stones or debris along the edge, to shed their nymphal skins. Unfortunately for the writer, the sequence of events took place so rapidly that he was unable to gain a sound judgement of the manner by which the transformation was accomplished. Tiensuu,[4] in his description of *Polymitarcys ladogensis,* a closely related European species of the family Ephemeridae, reported a similar incident of emergence.

Bottles of water collected from the Susquehanna River, which harbored the nymphs of *H. occulta,* gave a hydrogen-ion concentration of 7.7, apparently a most favorable medium for the

[3] Cooke, Herman G. 1947. Swarm behavior of *Hexagenia atrocaudata* in relation to temperature and relative humidity (Ephermeroptera). Ent. News 58: 221.

[4] Tiensuu, L. 1935. On the Ephemeroptera-fauna of Laatokan Karjala (Karelia Ladogensis). Suomen Hyoteistieteellinen Aikakauskirja 1: 3.

growth and development of the species. The greatest collections of adults were made at twilight. During this time the swarm of insects were so thickly suspended in the air that one could gather a mass of living creatures from three to five centimeters deep in the bottom of a net with a single stroke.

Observation of Flight Movements

On August 28, 1947, at 6:00 P.M., with a temperature of 81° F., three *Hexagenia occulta* males were seen patrolling over the northern bank of the Susquehanna River, about a mile above the Conowingo Dam, near Conowingo, Maryland. At sundown, countless numbers of this species suddenly appeared springing with increasing fury from the shrubbery overhanging the bank of the river. The average height to which they ascended during swarming ranged from five to twenty feet above the ground. One of the most striking features in the performance observed was in the manner by which operations were conducted. Each male maintained its position, flying almost in a single spot, except when attracted by an approaching insect foreign to its group, or a member of the opposite sex. An imaginary zone circumscribed the outer borders of the huge company. Beyond this limit ardent males were seen eagerly returning to resume their places in the midst of the swarm. As the performance reached its peak, the boundaries disappeared and general flight activity became dispersed over the entire area. Both the vertical zigzag-like movements and the deep rhythmic undulations which were so highly characteristic of the behavior of *H. atrocaudata* were absent or inconspicuous in these maneuvers.

Numerous couples of these insects were observed in copulation, and, in some instances, collections were made before they could separate. At times, individuals were seen uniting in a vertical plane. Perhaps this position was due either to a hasty procedure on the part of the male in clutching, or an attempt by the female to elude her attacker.

During the greater part of the day thousands of specimens found shelter by clinging firmly to the under-surface of the leaves of bushes along the shore. They sat closely, side by side,

with their heads directed inward and at right angles to the central axis of the leaf. When disturbed, they immediately took to the air. Some made feeble attempts to mate with any member whom they could reach, while others struck nervously about in a state of disorder and confusion. The incident lasted for about one minute, after which the insects resettled in their former positions on the leaves.

Although weather conditions were recorded at a most favorable level for the last two weeks of August 1948, flight movements were greatly reduced in comparison with those stated for the same period during the previous year. Lyman [5] referred to such variations as cyclic trends in the population of *Hexagenia*. The writer has also reported similar fluctuations for alternating years in this genus.

The following table gives favorable temperature, wind velocity and general weather conditions [6] for certain days during one week when observations were made:

Date	Temperature (Fahrenheit)	Wind Velocity m.p.h.	Weather	Activity
August 26	90°	5.7	Clear	Slight
August 27	88°	4.5	Clear	No Activity
August 28	87°	4.8	Clear	No Activity
August 29	84°	7.0	Clear	Slight

On August 29, 1949 at sundown, with a temperature of 78° F., heavy flight movements again appeared in the same area. In addition to the densely suspended adults, waves of clumsy flying subimagoes, mixed among the group, circled briefly above and around the observer before settling upon him in great numbers, and in their escape many of them left their subimaginal skins firmly adhering to his clothes. Heaps of carcasses strewn over the shrubs and rocks served as a reminder of the specimens which had emerged and perished during the current season.

[5] Lyman, Earl F. 1944. Emergence, swarming and mating in *Hexagenia*. Ent. News 55: 207.

[6] Records of temperature, wind velocities and other weather conditions were obtained through the courtesy of the U.S. Weather Bureau at Philadelphia, Pa. All readings are given for 7:30 P.M., Eastern Standard Time.

Attention is called to the fact that during the last week of August and the first week of September 1950, only a few scattered remnants of companies of mayflies were encountered. However, range of temperature and weather conditions recorded was at a most favorable level. For instance, during the week of August stated above the temperature mounted to an all-time high of 96° F., with an average of 85° for the next seven consecutive days. As a comparison, during the same week of the two previous alternating years, flight movements reached a period of their greatest abundance.

Discussion

Several incidents of striking interest have been cited to the writer by eye-witnesses with regard to mass flight movement of these insects serving as a hazard to travelers and workers operating in the above area. An article released in an edition of the *Baltimore Sun* newspaper[7] lends added significance to the study. It revealed that on August 26, 1947, at 7:15 P.M., a mass flight of mayflies appeared swarming over the Pennsylvania Railroad along the banks of the Susquehanna River so densely suspended that they resembled a mid-winter snow drift. The report further stated that the fragile creatures hurled their tiny bodies upon the trolley power line (over the track) in such countless numbers that they formed a complete insulation around it. Because of this sudden blockage of the current, an electric train en route through the area was stalled for several hours.

As a compensation for the tendency toward shyness exhibited by *Isonychia* while in flight, *Hexagenia* demonstrated a more highly tolerant disposition toward its environment. Berner,[8] in his recent study of mayflies, remarked; "I have not observed the mating flights of *Isonychia*. As far as I have been able to ascertain there are only a few scattered notes describing

[7] August 27 edition of the *Baltimore Sun*. This news report was confirmed by the Bureau of Information of the Pennsylvania Railroad in Baltimore, Md.

[8] Berner, L. 1950. *The Mayflies of Florida*, Vol. IV, No. 4.

the mating of some of the species of this genus." According to the experience of the writer, in his study of *Isonychia,* it is reasonable to believe that the paucity of observations recorded on actual mating among different species of this genus is due either to the lofty height to which they frequently ascend, or to their keen sense of detecting disturbances in the surrounding environment. In some instances it appears to be a combination of both factors.

In a former paper involving major families of the order of mayflies, Spieth [9] made a comparative study pointing out the phylogenic relationship among the different genera of each group. On the one hand, he used the mouthparts and gills of nymphs, while on the other, he employed the wing venation and genitalia of adults. The results in both cases were found to be consistent. The degree of resemblance recorded between the species of *Hexagenia* and those of *Polymitarcus* indicates that they were derived from related stock. By the same token, I should like to call attention to the similarity in the method of emergence between members of these two genera, as described in an earlier paragraph of this paper.

Finally, in addition to the phylogenic data mentioned, mating flights reveal a technique, which is not only unique for the particular genus, but also, as far as I have been able to observe, species specific for the individuals by which the movements are being performed.

The writer wishes to express his graditude to Dr. N. Runner of the University of Pennsylvania for contributing an analysis of the river water.

To Users of "Current Entomological Literature"

The editor of the NEWS has on hand a number of reprints of the "List of titles of publications referred to by numbers in Entomological Literature in Entomological News." Anyone may obtain a copy, while the supply lasts, by sending 10 cents in stamps to the editor.

[9] SPIETH, H. 1933. The Phylogeny of Some Mayfly Genera. Jour. New York Ent. Soc., Vol. XLI, September.

Notes on Leptothorax bradleyi Wheeler and L. wheeleri M. R. Smith (Hymenoptera: Formicidae) [1]

By E. O. Wilson, Department of Zoology and Entomology, University of Tennessee

Distributional data published up to the present for the closely related species *Leptothorax bradleyi* and *L. wheeleri* have outlined ranges which appeared to be mutually exclusive. When I recently examined specimens of this complex from two localities in Alabama, I considered that they might approach intergrades between the two species, thus indicating that the two were actually subspecies. However, when representative specimens were borrowed from most of the collections which have been made of these forms, it was quickly established that the Alabama material was typical *bradleyi*. Furthermore, the ranges of the two species were found to overlap through at least three states, definitely establishing them as distinct species. The following paper consists of the new distributional data and additional significant descriptions.

Workers of the two species are most easily distinguished on the basis of sculpturing, but they also differ in alitrunk profile, in proportions of the propodeal spines, and in size. In the descriptions given below only the characters useful in comparison are emphasized.

Leptothorax wheeleri M. R. Smith

L. wheeleri M. R. Smith, Ann. Ent. Soc. Amer., Vol. 22, p. 547, fig. 1 (1929). Workers and queens.

Worker. Ten workers representing all available records showed the following measurements: alitrunk length 0.90 mm.–1.13 mm., mean 1.04 mm.; head length 0.83 mm.–1.02 mm., mean 0.91 mm.; distance between the tips of the propodeal

[1] Appreciation is expressed to Dr. M. R. Smith, Dr. Arnold Van Pelt, Dr. A. C. Cole, and Mr. H. T. Vanderford for the loan of most of the material used in this study.

spines 0.28 mm.–0.37 mm., mean 0.30 mm.; length of propodeal spines 0.17 mm.–0.22 mm., mean 0.18 mm. (All measurements with maximum error of ±0.01 mm.) Alitrunks were measured in profile from the dorsal base of the pronotal collar to the dorsum of the junction with the petiole; heads were measured in profile from the anterior edge of the clypeus to the extreme occipital border.

Dorsum of head covered by longitudinal rugae, the interspaces coarsely punctate; the rugae extend forward past the fronto-clypeal suture as the clypeal carinae. Alitrunk coarsely rugo-reticulate. Petiole with distinct rugulae, fainter than those of the alitrunk. Postpetiole with a few faint rugulae, the interspaces punctate, the surface opaque.

Alitrunk arcuate in profile, rising to its highest point at the pronotum.

Localities. Specimens were examined from the following localities: Mississippi State College (M. R. Smith); Starkville, Miss. (M. R. Smith); War Trace, Tenn. (H. T. Vanderford); Greenbriar Cove, Great Smoky Mts. Nat. Park, Tenn. (A. C. Cole); Wilmington, N. C. (H. T. Vanderford); Dalton, Ga. (H. T. Vanderford); Gainesville, Fla. (T. H. Hubbell). Smith also recorded this species from Adaton, Miss., and L. G. and R. G. Wesson recorded it from South Central Ohio (Amer. Mid. Nat., Vol. 24, p. 96).

Leptothorax bradleyi Wheeler

L. bradleyi Wheeler, Psyche, Vol. 20, p. 113 (1913). Holotype worker.

Worker. Ten workers representing all of the available records showed the following measurements: alitrunk length 0.83 mm.–0.93 mm., mean 0.89 mm.; head length 0.70 mm.–0.80 mm., mean 0.74 mm.; distance between the tips of the propodeal spines 0.25 mm.–0.28 mm., mean 0.27 mm.; length of the propodeal spines 0.08 mm.–0.15 mm., mean 0.13 mm.

Alitrunk evenly flattened in profile.

Sculpturing of the head similar to that in *L. wheeleri.* The entire mesonotum except for the margins finely rugulo-reticulate, giving a granulose appearance at magnifications of 36 × and less.

The posterior edge of the pronotum similar to mesonotum, but the anterior half rugo-reticulate. This reticulum merges with the posterior rugulo-reticulum, and the latter decreases in size anteriad until its interspaces are distinguished only as broad punctures within the coarser, anterior reticulum. The margins of the mesonotum longitudinally rugose. The reticulum of the basal face of the propodeum fades posteriad into coarse punctulation. The petiole punctate, opaque; sculpturing of the postpetiole irregular, with very shallow punctures, feebly shining to subopaque.

The colorations of *L. bradleyi* and *L. wheeleri* are nearly identical, a rich ferruginous red. In most of the *bradleyi* workers examined the posterior margins of the gastric segments are distinctly infuscate; this condition is absent in *wheeleri*.

Queen. Alitrunk length 1.33 mm.; head length 0.86 mm. Differing from the worker in the usual characters separating these two castes, in sculpturing, and in proportions of the propodeal spines. Mesonotal scutum and scutellum evenly flattened in profile, the posterior third of the scutellum sloping downward somewhat. The propodeal spines blunt and dentiform. Notaulices and parapsidal furrows absent.

Head covered by relatively coarse, longitudinal rugae (approximately thirty would be cut by a line drawn transversely across the center of the head); rugae variable in size, frequently anastomosing; the interspaces punctate. Central portion and collar of pronotum granulose, the pleural arms rugo-reticulate, with the two zones of sculpturing meeting abruptly. Mesothoracic scutum and epipleurites with finer, more evenly longitudinal rugae (approximately forty would be cut by a line drawn transversely across the center of the scutum). Scutellum with smaller, less regular, and indistinct rugae. Anterior margin of the propodeum rugose, the remainder granulose. Sides of the alitrunk mostly granulose, with a few marginal rugae. Petiole and postpetiole with numerous shallow, confluent punctures and a few indistinct longitudinal rugae; their surfaces feebly shining. The gaster without sculpturing, glabrous.

This queen differs very little from the cotype queen of *L.*

wheeleri loaned to me by Dr. Smith. It can be distinguished from Smith's specimen on the basis of the following characters: distinct transverse rugae present between the propodeal spines in *wheeleri,* absent in *bradleyi;* petiole and postpetiole opaque in *wheeleri,* feebly shining in *bradleyi*; propodeal spines fairly well developed in *wheeleri,* dentiform in *bradleyi*; and smaller size of *bradleyi.* Otherwise the two closely resemble one another in sculpturing, flattening of the alitrunk, infuscation of the posterior margins of the gastric segments (absent in *wheeleri* workers), and general habitus under low magnification. This convergence of characters seems to indicate that the queen caste has diverged more slowly than the worker caste. If this is true, it appears that the *bradleyi* worker more closely approaches the ancestral form, in weaker sculpturing, flattening of the alitrunk, coloration, etc.

Male. Alitrunk length 1.23 mm.; head length 0.52 mm. Antennae 12-jointed, with the funicular segments gradually diminishing in size distally and not forming a distinct club. Notaulices (Mayrian Furrows) present and distinct, converging directly behind the center of the mesonotum. Wings with greatly reduced venation, the following veins occurring in the forewing: Sc + R, R_1, Rsf_1, Rs + M, Rsf_5, Mf_1, M +CuA, A, cu-a. Mf_5, CuA, and A distad to cu-a present but faded and indistinct. In one of the two specimens examined a small crossvein (2r?) extends from Rsf_5 almost to the stigma. (See Brown and Nutting, Trans. Amer. Ent. Soc., Vol. 75, pp. 113–132, for a discussion of homology.) Hindwing with two very faint, basal abscissae. Costal, median, submedian, and cubital cells present in the fore wing; discoidal cell absent.

Most of head covered by longitudinal rugulae, the interspaces punctate, a condition approaching that of the worker; rugae of occiput indistinct, with a transverse trend. Most of the alitrunk covered by longitudinal rugulae, but these are finer and more closely set than those of head; interspace punctulations not apparent. Propodeum covered by shallow, confluent punctures. Petiole, postpetiole, and gaster shining, largely free from sculpturing. All of body except appendages jet black. Scape and

femora dark brown; funiculus and distal portion of legs light brown. Wings faintly iridescent.

Localities. Specimens were examined from the following localities: Bay Minette, Ala. (E. O. Wilson); Tuscaloosa, Ala. (E. O. Wilson and Ben Sanders, Jr.); Hoschton, Ga. (H. T. Vanderford); Gainesville, Fla. (A. Van Pelt); Lake Placid, Fla. (T. C. Schneirla). The type locality is Billy's Island, Okefenokee Swamp, Ga.

Knowledge of the biology of the two species is limited at present to scanty nesting data. Smith found the several colonies comprising the type series of *L. wheeleri* in crevices and cavities of solid deciduous trees and under the bark of rotten pine stumps. Hubbs found his Florida *wheeleri* in galleries in a stick of solid pine firewood. The Wessons (Amer. Mid. Nat., Vol. 24, p. 96) found this species "in galleries in the hardened, weathered logs on old deserted and tumbledown log cabins exposed to the sun. Two other colonies were found on large oak trees where they were nesting in dead stobs." Most of the other specimens of both species have been collected as strays. My two colonies of *L. bradleyi* were found by chipping away the thick bark of living pines. Both were in flat, well defined galleries in the bark about three to five feet above the ground. The Tuscaloosa nest was carefully dissected, and what probably represents the bulk of the colony was collected; this contained one dealate queen, 42 workers, two males, and a small number of worker larvae and pupae.

Eclomus nom. nov. (Diplopoda)

Eclomus nom. nov. is proposed to replace *Eclytus* Chamberlin 1952 (Ent. News, vol. 63, no. 1, p. 10) which is preoccupied by *Eclytus* Holmgren 1855 (K. Vet.-Akad. Handl., n.f., vol. 1, p. 127). Called to my attention through the courtesy of Dr. G. Stuart Walley.

R. V. CHAMBERLIN

The Identity of the Milliped Genus Fontaria Gray (Polydesmida: Xystodesmidae)

By Richard L. Hoffman

Fontaria, the earliest described genus now included in the family Xystodesmidae (Fontariidae of several authors), was proposed by J. E. Gray in 1832 (in Griffith's edition of "Cuvier's Animal Kingdom," vol. 15, p. 787, pl. 135, fig. 1). The text description is very brief, consisting only of a few words relating to the color, number of segments, and lack of ocelli. The drawings on Plate 135, however, are very good considering the early date of their execution. They show the entire animal in dorsal aspect, a ventral view of the 7th segment of the male, and a front view of the head.

The generotype of *Fontaria,* by monotypy, is *Julus virginiensis,* Drury (1770, Illus. Nat. Hist., vol. 1, pl. 43, fig. 8), or a species so identified by Gray (we have no assurance that both authors were dealing with the same species). Drury's original description, a drawing only, cannot be associated with any known species or genus. My first idea was to regard it as unidentifiable and unoccupied, and credit Gray with the first use of the name. At the suggestion of Dr. E. A. Chapin, however, I think it better to adopt a somewhat more conservative attitude. Dr. Chapin advises me (*in litt.*) concerning Drury's species: "In other groups workers have followed the first reviser and accepted his conclusions." In the lack of any definite information concerning the original Drury type specimen, this policy seems reasonable.

A considerable number of diverse types have been described under the name *Fontaria;* most of these have been properly recognized by the proposal of numerous generic names since 1895. However, the proper allocation of *Fontaria* has never been made, despite the fact that all necessary information has been available since 1944. Several earlier attempts have been made, rather unsuccessfully.

For many years the name *Fontaria virginiensis* was applied to the North American species now known as *Zinaria butleri*

(McNeill). This usage dates from H. C. Wood in 1865 (Proc. Amer. Philos. Soc., ser. 2, vol. 13, p. 221); the error in this case was pointed out by Chamberlin in 1943 (Bull. Univ. Utah, Biol. Ser., vol. 8, no. 2, p. 16), who observed that characters given in Pocock's redescription of the Gray type specimen did not obtain in the genus to which the name *Fontaria* was applied by Wood.

FIG. 1. Gray's illustration of the male genitalia of *Fontaria virginiensis*, redrawn from his figure 1b, plate 135 of the volume cited in the text.

In 1931 (Zoölogica, vol. 30, lief. 3/4, p. 69) Attems gave a diagnosis of *Fontaria* which was based in part on specimens figured but not identified. Chamberlin, in the paper cited above, recognized that the Attems figures represented a species that is not congeneric with the type of *Fontaria*, but he failed to realize that it was the species named *Fontaria acutidens* by Attems in 1909 (Ark. Zool., vol. 5, no. 3, p. 30) and later placed in the genus *Japonaria* by Verhoeff. Chamberlin renamed the species represented by the figures (under the unwarranted impression that Attems had called it *virginiensis*—which he neither did nor implied) and placed it in a new genus *Grayaria*—which is obviously a synonym of *Japonaria*, which has seven years priority.

Obviously the solution of this puzzle is contingent upon the proper allocation of the name *Fontaria* on the basis of the redescription of its type species by Gray. Fortunately, it now is possible to do this with considerable assurance.

In 1909, in the diplopod volume of the Biologia Centrali-Americana, Pocock gave a short but valuable description of Gray's type specimen, which, when taken in connection with the original drawings, gives a fairly accurate idea of the attributes of the genus *Fontaria*. Until 1944, however, no American form was known which corresponded well to what was known of that genus. In that year Loomis (Psyche, 1944, vol. 51, p. 173) described *Stelgipus agrestis* as a new genus and species, and unintentionally thus made known the long lost *Fontaria*. A specimen of "*Stelgipus*" at hand matches Pocock's description in all details, and agrees very well with Gray's illustrations. I believe it cannot be questioned that *Stelgipus* is a synonym of *Fontaria*. For those interested in the matter I provide herewith a reproduction of the Gray drawing of the gonopods of *virginiensis*. As shown, they might apply to the four genera *Sigmoria, Tucoria, Cleptoria,* or *Stelgipus,* but the spined condition of the sternites, mentioned by Pocock, eliminates all but the last.

I do not wish to imply synonymy of *virginiensis* and *agrestis*. These two names cannot be finally settled until the type of the former is re-examined, or until future work shows *Fontaria* to be a monotypic genus.

Notes and News in Entomology

Under this heading we present, from time to time, notes, news, and comments. Contributions from readers are earnestly solicited and will be acknowledged when used.

"Billion Pounds of Pesticides Produced during '51–'52 Season."—This is the headline in the Nat. Agr. Chem. Assn. *News*. That much of this is made up of insecticides (in addition to fungicides, herbicides, wood preservatives and rodenticides) may be concluded from other figures (R. B. Friend in Amer. Scientist, Jan., 1952) : 160 million pounds of calcium and lead arsenates, 47 million of DDT, etc., recorded for recent years.

Recent congressional hearings are a reflection of the concern of the public as to how much of these chemicals and of the newer

(*Continued at bottom of next page*)

Eutreta sparsa found on Chrysanthemum (Tephritidae)

By Franklin S. Blanton, Lieutenant Colonel, Medical Service Corps, U.S.A.

During the writer's recent stay at Cornell University, Dr. W. E. Blauveldt of the Department of Entomology gave him two specimens of *Eutreta sparsa* Wied. that were reared from galls on *Chrysanthemum* in greenhouses located on Long Island.

This fly belongs to the family Tephritidae formerly known as Trypetidae, and it normally breeds in galls on golden rod. There are a great many notorious pests belonging to this family, which are usually called fruit flies. Entomologists and many fruit growers are very familiar with the names of such genera as *Anastrepha, Dacus, Ceratitis* and *Rhagoletis.*

Chrysanthemum is no doubt an incidental or accidental host for *Eutreta sparsa* but it is possible that this fly will cultivate a taste for *Chrysanthemum* especially in the absence of golden rod. After all, the writer prefers steak, but manages to get along quite well on frankfurters.

Notes and News

(*Continued from preceding page*)

ones, with their fascinating trade names and abbreviations, may be present on the dinner table. Meanwhile, in defense of entomologists, it may be pointed out that they too are not entirely happy. Dr. Friend, for example, although he finds that chemical insecticides are absolutely necessary for high production of crops, has "always considered that chemical control of insect pests is a last resort. Other methods based more upon ecology would be preferred . . ." (*l.c.*, p. 138). And V. B. Wigglesworth, of Cambridge, England, speaks in a similar vein (Advancement of Sci. 7: 161): "We need more not less entomological research. By all means let us use insecticides when we can do no better. But we should regard them, as C. B. Williams has emphasized more than once, as an admission of failure, to be replaced by the more subtle and more remunerative methods of biology as soon as these can be worked out."—R. G. S.

Current Entomological Literature

COMPILED BY R. G. SCHMIEDER AND J. W. H. REHN

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1951 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

NOTE: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—Bailey, S. F.—Dudley Moulton. [60] 27: 145–47. **Beebe, W.**—Migration of insects (other than Lepidoptera) through Portachuelo Pass, Rancho Grande, North-central Venezuela. [95] 36: 255–66. **Freeman, T. N.**—Some problems of insect biology in the Canadian Arctic. Trans. Roy. Soc. Canada 45: 208 (Abstract). **Hemming, F.**—The problem of stability in specific nomenclature, with special reference to cases where type material is no longer in existence. [Jour. Soc. British Ent.] 2: 1–15. **Hering, E. M.**—Biology of the leaf miner. Pp. iv–420, ill., Dr. W. Junk, 's-Gravenhage, 1951. **Mackerras, I. M.**—Marine insects. [Proc. Roy. Soc. Queensland] 61: 19–29. **Penn, G. H.**—A brief chronology of the history of entomology in Louisiana. [Proc. Louisiana Acad. Sci.] 14: 72–87. **Rockwood, L. P.**—Notes on insects associated with polyphyllus in the Pacific northwest. [60] 27: 149–56. **Vappula, N. A.**—Finnish entomological literature published in 1949 including economic entomology and control of insect pests. [Ann. Ent. Fennici] 17: appendix, 1–17. **Walz, A. J.**—Rearing the greenbottle fly on dog biscuits. [60] 27: 191–92.

ANATOMY, PHYSIOLOGY, MEDICAL—Anon.—Insect physiology and applied entomology. [53] 168: 974–75 (Report of papers at meeting of Assoc. Appl. Biol.). **Bodenstein, D.**—The hormones in molting and metamorphosis. [9] 111: 441 (Abstract). **Boettiger, E. G.**—Stimulation of the flight muscles of the fly. [9] 111: 443 (Abstract). **Brown, F. A., Jr.**—Regulation of distal retinal pigment cells

of the Crustacean compound eye. [9] 111: 442 (Abstract). **Bunker, H. P. and B. B. Speicher**—Inheritance of physiological activity in Habrobracon. [Genetics] 36: 545 (Abstract). **Burdette, W. J.**—Administration of diethylstilbestrol to the tu-36a strain of Drosophila melanogaster. [Genetics] 36: 545–46 (Abstract). **Burgess, L. E., E. H. McNeil, J. D. Solomon and D. T. Rolfe**—A preliminary study of the riboflavin-like effect of a pterine isolated from the egg of a grasshopper. [9] 111: 535 (Abstract). **Chang, S. L. and F. E. Richart, Jr.**—Studies on Anopheline larvae. I. The anatomy and function of the so-called 'Notched Organs' of Nuttall and Shipley on the thorax of larvae of Anopheles quadrimaculatus. [Journ. Nat. Mal. Soc.] 10 (4): 287–292, ill. **Chefurka, W. and C. M. Williams**—Biochemical changes accompanying the metamorphosis of the blood of the Cecropia silkworm. [9] 111: 516–17 (Abstract). **Collins, M. S.**—Variations in the fat body of Reticulitermes flavipes. [9] 111: 477 (Abstract). **Dias, E. e A. C. Chandler**—Molétias humanas transmitidas por hemipteros sugadores. [49] 47: 403–22, ill. Human diseases transmitted by parasitic bugs. *Ibid.* 423–41. **Downs, W. G. and E. Bordas**—Anopheles aztecus, malaria, and malaria control in the Valley of Mexico. [Journ. Nat. Mal. Soc.] 10 (4): 350–58. **Drees, O.**—Verhaltungsphysiologische Untersuchungen über instinktive Verhaltungsweisen bei Salticiden. [Zool. Anz.] Suppl. 15: 186–92. **Dunmore, L., Jr.**—Caste differences in toleration of drying in Reticulitermes flavipes. [9] 111: 513 (Abstract). **Dutt, M. K.**—Studies on chromosome behavior in Chrotogonus sp. (Acrid., Prygom.). [Proc. Zool. Soc. Bengal] 3: 108–17. **Edmondson, M.**—Induction of sterility mutations in ultraviolet-treated polar cap cells of Drosophila. [Genetics] 36: 549 (Abstract). **Fair, G. M., S. L. Chang and F. E. Richart, Jr.**—Studies on Anopheline larvae. II. The mechanism involved in the flotation of larvae of A. quadrimaculatus on a water surface. [J. Nat. Mal. Soc.] 10 (4): 293–305, ill. **Farnsworth, M. W.**—Effects of the homozygous Minute-IV deficiency on the development of Drosophila. [Genetics] 36: 550 (Abstract). **Friedler, G. and D. T. Ray**—Androgenesis and mutation in the wasp Mormoniella. [9] 111: 475 (Abstract). **Gardner, E. J.**—Genes producing a maternal effect in Drosophila melanogaster. [Genetics] 36: 551 (Abstract). **Gaul, A. T.**—A relation between temperature and wing beats. [18] 46: 131–33. **Gaulden, M. E.**—

Prolonged visible change produced by heat in the chromatin of living grasshopper neuroblasts. [Genetics] 36: 551–52 (Abstract). **Gowen, J. W. and J. Stadler**—Irradiation effects on viability of Drosophila melanogaster. [9] 111: 497 (Abstract). **Groot, H., S. Renjifo and C. Uribe**—Trypanosoma ariarii n. sp. from man, found in Columbia. [Amer. J. Trop. Med.] 31 (6): 673–91, ill. (Triatoma expts.). **Hardy, G. H.**—The reticulation theory of wing venation theory in Diptera. [Jour. Soc. British Ent.] 4: 27–36, ill. **Harnly, M. H.**—Size of parts present vs. number of parts present in the development of Drosophila melanogaster. [41] 118: 21–36. An optimum-temperature hypothesis for the heat reaction curves of Drosophila melanogaster. *Ibid.* 37–69. **Hartung, E. and W. Hartnett**—A study of the relation of various dietary factors to tumor incidence in Drosophila melanogaster. [9] 111: 500 (Abstract). **Hassenstein, B. and W. Reichardt**—Funktionsanalyse der Bewegungsperzeption einen Käfers (Col., Chlorophanus sp.). [Naturwiss.] 38: 507. **Hinton, H. E.**—The structure and function of the endocrine glands of the Lepidoptera. [Proc. Trans. South London Ent. Nat. Hist. Soc.] 1950–51: 124–60, ill. **Hopla, C. E.**—Experimental transmission of Tularemia by the tropical rat mite. [Amer. J. Trop. Med.] 31 (6): 768–82, ill. **Howe, R. W. and H. D. Burges**—Studies on beetles of the family Ptinidae. VI. The biology of Ptinus fur and P. sexpunctatus. [19] 42: 499–511 (Food, temp., diapause). **Hurlbert, H. S., R. M. Altman and C. Nibley, Jr.**—DDT resistance in the Korean body lice. [80] 115: 11–12, 1952. **Islas, S., F.**—Breve estudio morfologico del imago de la mosca prieta de los citricos (Homoptera: Aleyrodiidae). [8] 22: 313–22, ill. **Laidlaw, W. B. R.**—A preliminary enquiry into the influence of solar radiation on insect environment, with special reference to the relation between pest epidemics and fluctuation in solar radiation. [Jour. Soc. British Ent.] 2: 17–80. **Lenz, F.**—Mittelbare Geschlechter-Findung bei Dipteren. [Zool. Anz.] Suppl. 15: 285–89. **Levenbook, L. and C. M. Williams**—Mitochondrial cytochrome C and wingbeat frequency of flies. [9] 111: 515 (Abstract). **Levitan, M.**—Response of the chromosomal variability in Drosophila robusta to seasonal factors in a Southwest Virginia woods. [Genetics] 36: 561–62 (Abstract). **Luce, W. M.**—Reduction in facet number in full-eyed (reverted Bar) Drosophila to X-rays. [Genetics] 36: 563 (Abstract). **Luce, W. M., H. Quastler and H. B. Chase**—Reduction in facet number in bar-eye

Drosophila by X-rays. [Genetics] 36: 488–99. **Ludwig, D.**—Changes in the distribution of nitrogen during the embryonic development of the Japanese beetle, Popillia japonica. [9] 111: 446 (Abstract). **Nuorteva, P.**—Experimentelle Untersuchungen über die Nährpflanzenwahl einer oliophagen Zikade, Aphrophora alni (L.) (Cercopidae). [Ann. Ent. Fennici] 17: 10–17. **Ketchell, M., N. Feder and H. A. Schneiderman**—The effects of temperature, oxygen pressure, and metabolic inhibitors on in vitro spermatogenesis in the Cecropia silkworm. [9] 111: 518 (Abstract). **Kloft, W.**—Vergleichende Untersuchungen an einigen Coccidеn und Aphiden. [Zool. Anz.] Suppl. 15: 290–96 (Effects on host plants). **Koch, A.**—Untersuchungen über Wachstumsaktivatoren. [Zool. Anz.] Suppl. 15: 51–58. **Mackensen, O.**—Viability and sex determination in the honey bee (Apis mellifera L.). [Genetics] 36: 500–09. **Manna, G. K.**—Multiple sex-chromosome mechanism in a reduviid bug, Conorhinus rubrofasciatus. [Proc. Zool. Soc. Bengal] 3: 155–61. **Merrell, D. J.**—Selective mating in laboratory populations of Drosophila. [Genetics] 36: 565 (Abstract). **Mickey, G. H. and J. Blount**—Somatic polyploidy in Drosophila melanogaster treated with cold shock. [9] 111: 466–67 (Abstract). **Mittler, S.**—Variation in tumor formation in D. melanogaster reared on yeasts that do not require vitamins or amino acids. [Genetics] 36: 567 (Abstract). **Musgrave, A. J. and J. J. Miller**—A note on some preliminary observations on the effect of the antibiotic terramycin on insect symbiotic micro-organisms. [23] 83: 343–45. **Passano, L. M.**—The X organ-sinus gland neurosecretory system in crabs. [9] 111: 502 (Abstract). The X organ, a neurosecretory gland controlling molting in crabs. *Ibid.* 559 (Abstract). **Philip, C. B. and G. M. Kohls**—Elk, winter ticks and Rocky Mountain spotted fever: A query. [Public Health Rpts.] 66 (50): 1672–75. Plague infection in Lincoln County, Washington. *Ibid.* 1680. **Plus, N.**—Courbes de multiplication du virus de la sensibilité au CO_2 chez la Drosophila. [C. R. Acad. Sci.] 233: 1489–91. **Rainey, R. C.**—Weather and the movements of locust swarms: a new hypothesis. [53] 168: 1057–60. **Ray, D. T.**—Hatchability of fertilized and unfertilized eggs of the wasp Mormoniella as shown by the Nujol technique and its relation to sex determination. [9] 111: 472–73 (Abstract). **Robinson, H. S.**—The effects of light on night-flying insects. [Proc. Trans. South London Ent. Nat. Hist. Soc.] 1950–51: 112–23. **Rothenbuhler, W. C., J. W. Gowen**

and O. W. Park—Androgenesis in gynandromorphic honey bees (Apis mellifera L.). [Genetics] 36: 573 (Abstract). **Sarkaria, D. S., S. Bettini and R. L. Patton**—A rapid staining method for clinical study of cockroach blood cells. [23] 83: 329–32, ill. **Schmidt, E. L. and C. M. Williams**—An analysis of the metamorphosis hormone of Lepidoptera by the method of tissue culture. [9] 111: 517–18 (Abstract). **Schneiderman, H. A., N. Feder and M. Ketchell**—The cytochrome system in relation to in vitro spermatogenesis in the Cecropia silkworm. [9] 111: 518 (Abstract). **Smith, M. V. and G. F. Townsend**—A technique for mass-marking honeybees. [23] 83: 346–48. **Stalker, H. D.**—Diploid parthenogenesis in the cardini species group of Drosophila. [Genetics] 36: 577 (Abstract). **Tahmisian, T. N.**—The response of Melanoplus differentialis cells to X irradiation before and after induction. [9] 111: 574 (Abstract). **Tassoni, J. P.**—The nitrogen to protein conversion factors for the pupae of the moth, Telea polyphemus Cramer. [9] 111: 446 (Abstract). **Welsh, J. H.**—New evidence concerning the source and action of the eyestalk hormone. [9] 111: 442 (Abstract). **White, M. J. D.**—Supernumerary chromosomes in the Trimerotropine grasshoppers. [Genetics] 36: 582–83 (Abstract). **Whiting, A. R.**—Absence of mutagenic effect of heavily irradiated host on the parasitic wasp Habrobracon. [9] 111: 565 (Abstract). **Whiting, P. W.**—X-ray induced eye color mutations in chalcidoid wasps. [9] 111: 476 (Abstract). **Williams, C. M.**—Endocrine control of the complete metamorphosis of insects. [9] 111: 441 (Abstract). **Van der Kloot, W. and C. M. Williams**—Instinctive movement patterns in the cocoon-spinning of the Cecropia silkworm. [9] 111: 516 (Abstract).

ARACHNIDA AND MYRIOPODA—Boyce, H. R. and E. J. LeRoux—A note on dipterous predators of the European red mite Metatetranychus ulmi (Koch). [23] 83: 332. **Drees, O.**—(See under Anatomy.) **Gowda, B. N. Bole**—The chromosome study in the spermatogenesis of two lynx-spiders (Oxyopidae). [Proc. Zool. Soc. Bengal] 3: 95–107. **Levi, H. W. and L. R.**—Report on a collection of spiders and harvestmen from Wyoming and neighboring states. [95] 36: 219–37.

SMALLER ORDERS—Dunmore, L.—Isoptera. (See under Anatomy.) **Edmunds, G. F.**—New species of Utah Mayflies. I. Oligoneuridae (Ephemeroptera). [65] 53: 327–41, ill. **Gardner, A. E.**—The early stages of Odonata.

[Proc. Trans. South London Ent. Nat. Hist. Soc.] 1950–51: 83–88, ill. **Henson, H.**—On the wings of Forficula auricularia (Dermaptera). [68] 26: 135–42. **Hornuff, L. E.**—A further study of Aphylla williamsoni Gloyd (Odonata, Aeschnidae). [Proc. Louisiana Acad. Sci.] 14: 39–44. **Hurlbert, et al.**—Siphonaptera. (See under Anatomy.) **Knowlton, G. F.**—Corrodentia in bee hives. [18] 46: 134. **Tilden, J. W.**—A note on the manner of feeding of Agulla adnixa Hagen (Raphidiodea). [60] 27: 192.

ORTHOPTERA—Dutt, M. K.—(See under Anatomy.) **La Rivers, I.**—New Nevada Orthoptera records for the 1949 collecting season. [60] 27: 173–80. **Manna, G. K.**—(See under Anatomy.) **Rainey, R. C.**—(See under Anatomy.)

HEMIPTERA—Bailey, N. S.—The Tingoidea of New England and their biology. [27] 31: 1–140. **Bodenheimer, F. S. and A. Harpaz**—Holometabolic development in the males of Coccoidea. [Bull. Res. Council Israel] 1: 133–35. **Boudreaux, H. B.**—The insect family Aphididae in Louisiana. [Proc. Louisiana Acad. Sci.] 14: 14–22. **Bradley, G. A.**—A field key to the species of Cinara (Aphid.) of Canada east of the Rockies. [23] 83: 333–35. **Dias e Chandler**—(See under Anatomy.) **Drake, C. J.**—New water striders from insular America (Veliidae). [65] 53: 338–40. **Drake, C. J. and R. F. Hussey**—Concerning some American Microvelia (Veliidae). [31] 34: 137–45 (*). **Eastop, V. F.**—Diurnal variation in the aerial density of Aphididae. [68] 26: 129–34. **Fiedler, C.**—Revision der Rüsslergattung Cleogonus (Curc., Cryptorrh.) [6] 4: 1201–18. Die Rüsslergattung Rhinochenus und Blaborhinus. *Ibid.* 1102–20. **Flock, R. A.**—A new species of Haplaxius, with a key to California species. [60] 27: 169–70 (Cixiidae). **Herring, J. L.**—The aquatic and semiaquatic Hemiptera of northern Florida. Part 4: Classification of habitats and keys to the species. [31] 34: 146–61. **Hottes, F. C.**—A method for taking aphids in flight. [60] 27: 190. **Islas, S., F.**—(See under Anatomy.) **Kloft, W.**—(See under Anatomy.) **Nuorteva, P.**—(See under Anatomy.) **Penn, G. H.**—Additional records of aquatic Hemiptera in Louisiana. I. Nepidae, Hydrometridae and Naucoridae. [Proc. Louisiana Acad. Sci.] 14: 67–71. **Sibley, L. M.**—A study of Reduviids in Louisiana. [Proc. Louisiana Acad. Sci.] 14: 88–93.

LEPIDOPTERA—Clark, A. H. and L. F.—The butterflies of Virginia. [82] 116 (7): i–vii, 1–239, ill. **Hering, E. M.**—(See under General.) **Hinton, H. E.**—(See under

Anatomy.) **Rawson, G. W., J. B. Ziegler and S. A. Hessel**—The immature stages of Mitoura hesseli R. and Z. (Lycaenidae). [18] 46: 123–30, ill. **Robinson, H. S.**—(See under Anatomy.) **Torre y Callejas, S. L. de la**—A new butterfly from Cuba (Nymphalidae). [65] 53: 336–37, ill. **Van der Kloot and Williams**—(See under Anatomy.) **Vazquez, G., L.**—Un nuevo psiquido mexicano del genero Oiketicus (Psychidae). [8] 22; 323–33, ill.

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